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Iterative solution methods for mesh approximation of control and state constrained optimal control problem with observation in a part of the domain

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Abstract

© 2014, Pleiades Publishing, Ltd. Iterative solution methods for finite-dimensional constrained saddle point problems are investigated theoretically and numerically. These saddle point problems arise when approximating differential optimal control problems with point-wise state and control constraints by finite element or finite difference schemes with further using Lagrange multipliers technique. The linear elliptic boundary value problems with distributed control and the observation in a part of the domain are considered. Equivalent transformations of the constructed finite-dimensional saddle point problem are executed to apply effectively Uzawa-type iterative methods. Numerical comparison of these methods with gradient method for a regularized problem and interior point method is done.

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Keywords

elliptic equation, state and control constrained optimal control problems, Uzawa-type iterative methods